

Claims

- [c1] A system for collecting and storing well data at geographically spaced wells comprising:
- a central data store adapted to receive data from a distant source through a predefined communication path;
 - a plurality of well monitors, each of which is adapted to be associated with a gas or oil wells and each of which is programmed to record oil or gas well production data at a given oil or gas well location, each of the well monitors further having a transceiver for transmitting a wireless signal representative of the recorded oil or gas production data of the respective well that it is associated with, the well monitors are further programmed to receive wireless signals representative of data from other of said well monitors and transmit the received data to other of said well monitors and to a data transmission processor;
 - the data transmission processor is adapted to be placed in a field location geographically spaced from the oil or gas wells that have at least one of said well monitors associated therewith, the data transmission processor has a receiver that is adapted to receive wireless data signals transmitted from at least one the well monitors, has a converter to convert the received wireless data from the at least one well monitor to a communication signal and has transmission connection to send the converted communication signal from the field location to the central data store ;
 - whereby oil or gas well production data can be transmitted to the central data store by hopping from well monitor to well monitor to the data collection and transmission processor which can then, in turn, transmit the oil or gas well production data to the central store for storage and analysis.
- [c2] The system of claim 1 wherein the data store computer processor is programmed to make selective data in the data storage medium available to one or more remote users under predetermined conditions.
- [c3] The system of claim 2 wherein the data store computer processor is further programmed to retrieve data upon requests from one or more well monitors.

- [c4] The system of claim 3 wherein the data store has a computer processor that is programmed to retrieve data from one or more well monitors upon request from the one or more remote users under certain conditions.
- [c5] The system of claim 4 wherein the central store computer processor is programmed to encode data packets to and from the well monitors with address unique to each of the well monitors and each of the well monitors is programmed to pass on to another well monitor data packets that it receives and that has an address different than the address of the respective well monitor. .
- [c6] The system of claim 1 wherein each of the well monitors is programmed to transmit data over radio waves in a 900 MHz frequency band.
- [c7] The system of claim 1 wherein the integrated communications and control unit comprises a radio module and a central processing unit that run solely on transistor-transistor logic (TTL) level voltages.
- [c8] The system of claim 1 and further comprising a recorder controller adapted to convert a voltage representative of the oxygen content in a gas line into a signal representative of the oxygen content in the gas line, a transmitter connected to the recorder controller for transmitting the signal representative of the oxygen content of the gas line to the central data store through a wireless signal that hops along a path that includes at least two of the well monitors and the data collection and transmission processor.
- [c9] The system of claim 1 wherein the data store computer processor is further programmed to retrieve data from one or more well monitors upon request from the one or more remote users under certain conditions.
- [c10] The system of claim 1 wherein the central store further comprises a computer processor that is programmed to encode data packets to and from the well monitors with an address unique to each of the well monitors and each of the well monitors is programmed to pass on to another well monitor data packets that it receives and that have an address different than the address of the respective well monitor.

- [c11] A method for communicating between wells and a remote location comprising the following steps:
- sending from a central data store to a field station a request data packet intended for a destination well unit;
- transferring the request data packet from the field station to a first well unit via radio waves;
- determining if the first well unit is the destination well unit; and
- if the first well unit is not the destination well unit, hopping the request data packet along a series of at least two well units, wherein the first well unit is part of the series, until the request data packet reaches the destination well unit.
- [c12] The method of claim 11 and further comprising the step of sending a response packet from the destination well unit to field station.
- [c13] The method of claim 12 and further comprising the step of hopping the response packet from the destination unit along the series of at least two well units if the first well unit is not the destination well unit until the destination packet reaches the field station.
- [c14] The method of claim 13 and further comprising the step of sending the response packet from the field station to the central data store.
- [c15] The method of claim 14 wherein the step of sending the response packet from the field station to the central data store is via the Internet.
- [c16] The method of claim 11 wherein the step of sending from a central data store to a field station a request data packet is via the internet.
- [c17] The method of claim 11 wherein there are a plurality of well units and the step of sending from a central data store to a field station a request data packet is sent to the plurality of well units.
- [c18] The method of claim 17 and further comprising the step of requesting a data packet of the first well unit from the central data store from a remote user; and the step of

sending from a central data store to a field station a request data packet that is responsive to the request from the remote user.

- [c19] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells comprising the steps of:
gathering well production data relating to at least one of the spaced oil or gas producing wells;
transmitting the gathered well production data to a central data storage zone;
storing at least some of the transmitted data in the central storage zone;
wherein the transmitting step includes a well hopping step that includes transmitting data from the at least one well along a well hopping path that includes the at least one well and at least one other of said wells.
- [c20] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 wherein the transmitting step further includes transmitting the data between the well hopping path and the central data storage zone through the internet.
- [c21] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claims 19 and further comprising the step of correlating the transmitted data according to wells at the central data storage
- [c22] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 and further comprising the step of accessing selected portions of the stored data in the central data storage zone from a site remote therefrom.
- [c23] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 and further comprising the step of polling the least one well prior to the gathering step and the gathering step is responsive to the polling step.
- [c24] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 23 wherein the polling step is initiated from a

site remote from the central data storage zone.

- [c25] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 and further comprising the step of polling all of the wells and the gathering step includes gathering well production data from each of the poled wells.
- [c26] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 25 wherein the gathering step is responsive to the polling step.
- [c27] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 25 wherein the polling step includes transmission of data requests to each of the wells along the data transmission path but in the opposite direction.
- [c28] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 wherein the well hopping step takes place between wells that are geographically spaced from each other a distance of no more than 1 mile.
- [c29] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 wherein the well hopping step includes wireless transmission of the gathered data between the geographically spaced wells.
- [c30] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 29 wherein the wireless transmission is carried out by radio waves that are in the 900 MHz frequency band.
- [c31] A method for gathering operating data from a plurality of geographically spaced oil or gas producing wells according to claim 19 and further comprising the step of assigning to each of the well a unique address, and assigning to each well at least one well hopping path between each well and the central data store zone.
- [c32] A method for gathering operating data from a plurality of geographically spaced oil or

gas producing wells according to claim 19 further comprising the step of .detecting the level of oxygen in a production stream from one or more of the wells; wherein the gathering step includes gathering data related to the detected level of oxygen in a production stream from one or more of the wells.